

Appl. No.: 10/630,156  
Amdt. Dated: 01/29/2007  
Off. Act. Dated: 11/02/2006

RECEIVED  
CENTRAL FAX CENTER  
JAN 29 2007

### **REMARKS/ARGUMENTS**

Reconsideration of this application is respectfully requested in view of the foregoing amendments and discussion presented herein.

1. **Rejection of Claims 3, 4, 14, and 15 under 35 U.S.C. §112, first paragraph.**

Claims 3, 4, 14, and 15 were rejected under 35 U.S.C. §112, first paragraph as failing to comply with the enablement requirement. Specifically, the Examiner believes that "the specification does not enable each compliant member to be attached to second and third laminar contacts".

Claims 3, 4, 14, and 15 now specify that the second and third laminar contacts are attached to a subset of the compliant members, as is stated in paragraph [0031] of the original specification (paragraph [0033] of the published application). This rejection should now be withdrawn.

2. **Rejection of Claim 4 under 35 U.S.C. §112, second paragraph.**

Claim 4 was rejected under 35 U.S.C. §112, second paragraph as being indefinite. Specifically, the Examiner believes the phrase "electrical contact between attached" to be indefinite.

Claim 4 has been amended to omit the word "between". This rejection should now be withdrawn.

3. **Objection to Claim 19.**

Claim 19 is objected to as being in improper form because a multiple dependent claim must depend on multiple claims in the alternative only.

Claim 19 has been amended to include the subject matter of the claims referenced therein, and should no longer be objectionable.

4. **Rejection of Claims 1, 3-5, 9-15, 17-18, and 21 under 35 U.S.C. § 102(b).**

Claims 1, 3-5, 9-15, 17-18, and 21 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Published Patent Application No. 2002/0022382 by Franklin et al., with Merriam-Webster's Collegiate Dictionary, Tenth Edition, as evidentiary support.

Appl. No.: 10/630,156  
Amdt. Dated: 01/29/2007  
Off. Act. Dated: 11/02/2006

Claims 1, 20, 12, 13, and 21. The common feature of independent Claims 1, 10, 12, 13, and 21 is a "laminar electrical contact". On page 5 of the Office Action, the Examiner states:

Franklin teaches a fuel cell assembly comprising ... a conductive electrical contact attached to said independently acting compliant members (par. 99).

At the outset, it is noted that Claims 1, 10, 12, 13, and 21 claim a *laminar* electrical contact, and not simply 'an electrical contact'. Paragraph 99 of Franklin et al. discusses a particular embodiment of a compliant electrical contact (analogous to the compliant member 70 of the instant application), and discloses nothing whatsoever about a laminar electrical contact.

The Examiner appears to equate the "thin metal conductive plate" to which the compliant members are attached (paragraph [0099]) with the laminar electrical contact of the instant invention, which is an inaccurate characterization. The "thin metal conductive plate" of Franklin et al. is, in fact, the bipolar separator plate (BSP). Throughout Franklin et al., the term "thin metal BSP" or "thin metal plate BSP" is used to describe the BSP in the description and in the figures, and no other conductive plate is disclosed, discussed, or pictured. Paragraph [0078] describes the assembly of the stack in Franklin et al. as follows:

Compliant electrical contact is achieved in the subject fuel cell design by used of springs and contact points. In the spring design a large array of individual springs are attached to each BSP each of which makes intimate contact with the MEA [membrane electrode assembly] attached to the adjacent BSP, see FIG. 5 and [5A].

Paragraph [0027] of Franklin et al. indicates that the compliant contacts or springs are "electrically, mechanically, metallurgically or combinations thereof contacted and connected to a conducting base plate or BSP."

In this description, and in Figure 5, the compliant members are clearly attached to the thin metal BSPs, with the ends of the compliant members pointing outwardly. In Figure 13 of Franklin et al., which shows an uncompressed stack of BSPs, MEAs, and

Appl. No.: 10/630,156  
Amdt. Dated: 01/29/2007  
Off. Act. Dated: 11/02/2006

springs (compliant members), it is clear that the compliant members are attached only to the BSP, and that no other conductive plate is present.

Moreover, the placement of the elements in Franklin et al., according to paragraph [0077], must be a BSP having an MEA attached to one side and an array of compliant members attached to the other side. The ends of the compliant members are free in space, extending outwardly from the BSP.

Claim 1 of the instant application, on the other hand, requires not only a BSP having an MEA attached to one side and an array of compliant members attached to the other side, **but also** a conductive laminar electrical contact **attached to the compliant members**. Thus, a conductive laminar contact is the outwardly-facing surface, not an array of compliant members. No reading or interpretation of Franklin et al. places a laminar electrical contact in this position.

Claim 10 of the instant invention is directed to:

A laminar electrical contact for maintaining electrical contact between independently acting compliant members and a membrane electrode assembly in a fuel cell stack.

Again, the laminar electrical contact is located in the fuel cell stack *between the compliant members and the MEA*. This arrangement is not contemplated by Franklin et al., in which the compliant members are pressed into direct contact with the MEA in a stack configuration.

Claim 12 of the instant invention requires:

A method for maintaining electrical contact between a bipolar separator plate and a membrane electrode assembly in a fuel cell stack comprising placing independently acting compliant members and a laminar electrical contact between said bipolar separator plate and said membrane electrode assembly.

This claim requires the placement of independently acting compliant members and a laminar electrical contact between the BSP and the MEA. Again, Figure 13 of Franklin et al. shows the profile of a stack, which clearly shows only the compliant

Appl. No.: 10/630,156  
Amdt. Dated: 01/29/2007  
Off. Act. Dated: 11/02/2006

members and no laminar electrical contact. The thin plates in figure 13 are the BSPs, which is noted in the disclosure of Franklin et al. at paragraph [0063] ("FIG. 13 shows an uncompressed stack of bipolar separator plates, manifolds and springs."). No other elements are present in the stacks of Franklin et al.

Claim 13 of the instant invention requires:

A fuel cell module comprising:

- a bipolar separator plate with a first side and a second side;
- a membrane electrode assembly attached to said first side;
- flexible means for making electrical contact attached to said second side; and
- a laminar electrical contact attached to said flexible means.

As noted hereinabove in other independent claims, the laminar electrical contact is located on the opposite end of the flexible means for making electrical contact from the BSP. Franklin et al. does not contemplate attachments to both ends of the flexible means for making electrical contact. In Franklin et al., the object is to have an array of flexible contact points (e.g., spring contacts or contact pins) with which to contact the MEA.

Claim 21 of the instant invention requires:

A bipolar separator plate assembly for use in a fuel cell, comprising,  
a bipolar separator plate;  
independently acting compliant members attached to said bipolar separator plate; and  
a laminar electrical contact attached to said independently acting compliant members.

Once again, the laminar electrical contact is located on the opposite end of the compliant members relative to the BSP. The compliant members are "sandwiched" between the two layers, and physically attached to both the BSP and the laminar electrical contact.

It is impossible for Franklin et al. to anticipate this orientation, because Franklin

Appl. No.: 10/630,156  
Amdt. Dated: 01/29/2007  
Off. Act. Dated: 11/02/2006

et al. has only the BSP, and no other structure that could be a laminar contact.

Because Franklin et al. does not teach all of the elements in 1, 10, 12, 13, and 21, the rejection under section 102(b) with respect to Claims 1, 10, 12, 13, and 21, and the claims that depend therefrom, should be withdrawn.

Claims 17, 18, and 20. Claims 17, 18, and 20 are directed to fuel cell stacks comprising modules according to claims 13, 14, and 16, respectively. Claims 14 and 16 depend from claim 13. Arguments regarding Claim 13 in the above section are specifically incorporated in this section as if set forth in full. For the reasons outlined above, Franklin et al. cannot anticipate Claims 17, 18, or 20, requiring withdrawal of the rejection under section 102(b).

5. Claims 1, 3-5, 9-15, 17-18, and 21 are nonobvious.

Nor would the subject matter of Claims 1, 3-5, 9-15, 17-18, and 21 be obvious to a person having ordinary skill in the art in view of Franklin et al. Franklin et al. teaches a variety of forms for compliant electrical contacts that are attached to one side of a BSP with the unattached end pointing outward. An MEA is attached to the other side of the BSP. In a fuel cell stack, the compliant contacts are compressed into intimate contact with the next MEA. No other components are present in the stacks discussed and shown in Franklin et al., nor is any need for additional components or elements identified. In fact, the object of having independent "spring loaded electrical contacts" (paragraph [0074]) in Franklin et al. is not only to provide increased electrical contact, but also to provide "uniform internal load distribution" (paragraph [0026]) and to compensate for non-flat BSPs (paragraph [0097]) or variations in fabrication of assembly (paragraph [0100]). Nothing in Franklin et al. suggests that a laminar electrical contact would perform these functions, or even mentions laminar electrical contact. The only thin metal plate disclosed is the BSP itself. Franklin et al. does not suggest, teach, or otherwise provide motivation for a laminar electrical contact as recited in the Applicant's claims.

Therefore, since there is no need for a laminar electrical contact identified in

Appl. No.: 10/630,156  
Amdt. Dated: 01/29/2007  
Off. Act. Dated: 11/02/2006

Franklin et al., and further, since there is no suggestion, teaching, or motivation that can be found in Franklin et al. from which a person having ordinary skill in the art would find it obvious to modify the fuel cells therein to correspond to that described in the Applicant's claims, Claims 1, 3-5, 9-15, 17-18, and 21 recite structure which is patentable over the cited references for purposes of 35 U.S.C. § 103.

6. Rejection of Claims 2, 6-8, 16, and 20 under 35 U.S.C. § 103(a).

Claims 2, 6-8, 16, and 20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Published Patent Application No. 2002/0022382 by Franklin et al.

(a) Claims 2 and 16. With respect to Claims 2 and 16, the Examiner states the following:

Franklin does not teach apertures in the conductive laminar contacts. The reference is concerned with fastening attachments with bolts and screws. (claims 2 & 16, see par. 74).

Therefore, it would have been obvious to one of ordinary skill in the art to employ apertures in the conductive laminar contacts, in order to securely attach the contacts to the compliant members. As recognized by Franklin, the skilled artisan recognizes that fastening attachments such as apertures with screw fittings firmly secure abutting members.

At the outset, it is respectfully noted that the instant application nowhere makes mention of apertures being used to secure things. The Examiner's attempt to use apertures to "securely attach the [laminar electrical] contacts to the compliant members" is mere speculation. The Examiner is speculating that there is a relationship between elements when such a relationship does not exist, and then using that relationship to reject the claims for obviousness. This is clearly improper.

The Examiner's kind attention is directed to the fact that an aperture is "an opening or open space", or a hole (see the attached definition from Merriam-Webster Online). See Figures 5a and 6 of the instant application, indicating the apertures with reference numeral 74. "These apertures can be a variety of sizes and shapes, ranging

Appl. No.: 10/630,156  
Amdt. Dated: 01/29/2007  
Off. Act. Dated: 11/02/2006

from small holes to large slots many inches long" (paragraph [0029] of the instant application) (emphasis added). Nothing in the text, figures, or claims of the instant application indicates or suggests that the apertures are used to attach things together.

The portion of Franklin et al. cited by the Examiner, paragraph [0074], discusses the use of mechanical means (bolts, screws, cams, etc.) to "create suitable contact between the MEA and the adjacent BSP." Franklin et al. proposes "spring loaded electrical contacts" as a way to **provide electrical contact**, not to attach anything together. Franklin has nothing to do with attaching things together.

Moreover, in paragraph [0033] of the instant application, the attachment of the compliant contacts to the laminar electrical contact is disclosed, as follows:

The lamina 72 then may be attached to the compliant members 70 by welding, brazing or soldering or via pre-applied solder paste and soldered using conventional electronic circuit board manufacturing equipment and techniques or may be solely in mechanical and electrical contact. The compliant members 70 may be attached to the BSP 52 by welding, brazing or soldering or via pre-applied solder paste and soldered using conventional electronic circuit board manufacturing equipment and techniques or may be solely in mechanical and electrical contact.

The apertures 74 in the instant application have nothing to do with the attachment of the compliant members to the laminar electrical contacts. The instant application directly refutes the Examiner's improper and speculative conclusion.

The Applicant admits a lack of understanding as to the statement "As recognized by Franklin, the skilled artisan recognizes that fastening attachments such as apertures with screw fittings firmly secure abutting members." First, the Examiner stated that apertures were not found in the Franklin et al. reference; how can Franklin recognize anything about apertures? Second, apertures could not, under any circumstances, be considered "attachments"; apertures are merely holes. Third, "screw fittings" are not discussed in either Franklin et al. or the instant application. Finally, "fastening attachments such as apertures with screw fittings firmly secure abutting members" simply makes no sense. The apertures secure nothing. No screws or screw fittings are

Appl. No.: 10/630,156  
Amdt. Dated: 01/29/2007  
Off. Act. Dated: 11/02/2006

disclosed. Any "abutting members" that would be "secured" have nothing to do with the apertures—any attachment or securing is discussed in the instant application, such as in paragraph [0033].

As noted hereinabove, Franklin et al. discloses neither laminar electrical contacts nor apertures. There is no teaching, suggestion, or motivation to put apertures in any structure of Franklin et al. Thus, the rejection under section 103 cannot be sustained, and must be withdrawn.

(b) Claims 6-8. Claims 6-8 specify a dimension for the array of laminar electrical contacts relative to the dimensions of the MEA. It is noted that Franklin et al. does not disclose any laminar electrical contacts whatsoever, and thus, cannot render the instant invention obvious under section 103.

(c) Claim 20. With respect to Claim 20, the Examiner states the following:

With respect to claim 20, the fuel cell stack comprises multiple cells, wherein the laminar electrical contact of said first cell is in electrical contact with the membrane electrode assembly of the second cell. See Figure 14. Specifically, when the spring arrays are compressed, the individual spring contacts of neighboring cells are in positive electrical contact[.]

Claim 20 of the instant invention, as amended, requires:

A fuel cell stack comprised of  
a first module according to claim 16, and  
a second module according to claim 16,  
wherein the laminar electrical contact of said first module is  
pressed by said flexible means into electrical contact with the membrane  
electrode assembly of said second module.

Claim 20 has been amended to correct a typographical error. The module of Claim 16 contains only one laminar electrical contact, as it depends directly from Claim 13.

With respect to the Examiner's characterization of Franklin, the springs are oriented facing outward from the BSP. Each individual spring makes contact with the

Appl. No.: 10/630,156  
Amdt. Dated: 01/29/2007  
Off. Act. Dated: 11/02/2006

MEA when the stack is compressed. Franklin et al. discloses no laminar electrical contact, however. Claim 20 requires that the laminar electrical contact of the first module be in contact with the MEA of the second module.

See Figure 13 of Franklin et al, noting that the springs are clearly unencumbered at the ends opposite the BSP. That is, one end is attached to the BSP and the other end is free. Compression of the stack puts each individual spring into contact with the MEA, as stated in paragraph [0075] of Franklin et al:

Each BSP is held in intimate contact with the MEA via independent acting compliant spring electrical contacts . . . .

The "independent acting compliant spring electrical contacts" of Franklin et al. do not meet the requirements of the "laminar electrical contact" in Claim 20.

Conversely, the instant invention has a laminar electrical contact that is attached to the compliant contacts. Instead of the contacts having free ends, as in Franklin et al., the laminar electrical contact is attached to those ends, and the contacts are "sandwiched" between the BSP and the laminar electrical contact.

Notably, the Examiner specifically points out the "individual spring contacts" in Franklin et al., which are in direct contravention of the claim language, and which support the inevitable conclusion that Franklin et al. contains no laminar electrical contact. If a laminar electrical contact is present, there are no individual contacts to the MEA.

As noted hereinabove, Franklin et al. simply does not disclose laminar electrical contacts. There is no teaching, suggestion, or motivation to put such contacts in any structure of Franklin et al. Thus, the rejection under section 103 cannot be sustained, and must be withdrawn.

7. Amendments Made Without Prejudice or Estoppel.

Notwithstanding the amendments made and accompanying traversing remarks provided above, Applicants have made these amendments in order to expedite allowance of the currently pending subject matter. However, Applicants do not

RECEIVED  
CENTRAL FAX CENTER

JAN 29 2007

Appl. No.: 10/630,156  
Amdt. Dated: 01/29/2007  
Off. Act. Dated: 11/02/2006

acquiesce in the original ground for rejection with respect to the original form of these claims. These amendments have been made without any prejudice, waiver, or estoppel, and without forfeiture or dedication to the public, with respect to the original subject matter of the claims as originally filed or in their form immediately preceding these amendments. Applicants reserve the right to pursue the original scope of these claims in the future, such as through continuation practice, for example.

8. Conclusion.

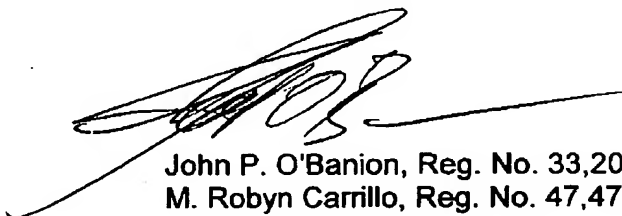
Based on the foregoing, Applicants respectfully request that the various grounds for rejection in the Office Action be reconsidered and withdrawn with respect to the presently amended form of the claims, and that a Notice of Allowance be issued for the present application to pass to issuance.

In the event any further matters remain at issue with respect to the present application, Applicants respectfully request that the Examiner please contact the undersigned below at the telephone number indicated in order to discuss such matter prior to the next action on the merits of this application.

Date:

1/29/07

Respectfully submitted,



John P. O'Banion, Reg. No. 33,201  
M. Robyn Carrillo, Reg. No. 47,474  
O'BANION & RITCHEY LLP  
400 Capitol Mall, Suite 1550  
Sacramento, CA 95814  
(916) 498-1010

Attachment

Page 16



- Home
- Visit Our Sites
- Premium Services
- Downloads
- Word of the Day
- Word Games
- Open Dictionary
- Spelling Bee Hive
- Word for the Wise
- Online Store
- Help
- About Us

**Wish it included preferred rates on select gym memberships and Rx drug coverage?**

Kaiser Permanente

Also Visit [Unabridged Dictionary](#) [Learner's Dictionary](#) [Word Central for Kids](#) [Collegiate Dictionary](#) [Encyclopedia](#)

☒ Dictionary ☐ Thesaurus ☐ Spanish/English

Search

## aperture

One entry found for **aperture**.

**Main Entry: ap·er·ture**

Pronunciation: 'ap-&(r)-"chur, -ch&r, -"tyur, -"tur

Function: *noun*

Etymology: Middle English, from Latin *apertura*, from *apertus*, past participle of *aperire* to open

**1** : an opening or open space : **HOLE**

**2 a** : the opening in a photographic lens that admits the light **b** : the diameter of the stop in an optical system that determines the diameter of the bundle of rays traversing the instrument **c** : the diameter of the objective lens or mirror of a telescope

Learn more about "aperture" and related topics at [Britannica.com](#)

Get the [Top 10 Search Results for "aperture"](#)

### Ads by Google

#### Digital SLR Camera Review

World's largest database of Digital SLR camera reviews & tests.  
[alaTEST.com/Digital\\_SLR\\_Reviews](#)

#### Digital Camera Reviews

Digital Camera buying advice, reviews, specs and price compare  
[www.DigitalCameraReview.com](#)

#### Servo system comparison

Detailed study of digital vs. other servo technology (for OEMs only)  
[www.tekmlc.com](#)

#### Pronunciation Symbols

Browse the  
[A](#) [B](#) [C](#) [D](#) [E](#) [F](#) [G](#) [H](#) [I](#) [J](#) [K](#) [L](#) [M](#) [N](#) [O](#) [P](#) [Q](#) [R](#) [S](#) [T](#) [U](#) [V](#) [W](#) [X](#) [Y](#) [Z](#)

### Ads by Google

[Top 10 Digital Cameras Ranked By Power](#)  
[Spliceindex.com](#)

[Unbiased Reviews](#)  
CNET has Digital Camera Reviews & Price Comparison  
[www.CNET.com](#)

[Best Digital Camera](#)  
Looking for the Best Digital Camera? Visit Consumer Reports  
[www.ConsumerReports.org](#)

BEST AVAILABLE COPY